

### **ABSTRACT OF THE DISCLOSURE**

Methods for the detection and measurement of tagged (labeled) biologically active materials in a sample are described. The tagged biologically active materials are detected using an atomic mass or optical spectrometer having a source of atoms or atomic ions. Element-labeled biologically active materials, comprising antibodies, antibody Fab' fragments, antigens, aptamers, protein complexes, growth factors, hormones, receptors and other biologically active materials attached to a stable elemental tag, can be used in specific binding assays and measured by elemental spectroscopic detection. Also described are methods for the determination of metals in samples of interest using specific antibodies to isolate the target metals and elemental spectroscopy for detection and quantitation. Kits are provided comprising reagents to detect and measure labeled biologically active materials or labeled competition analytes.